(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 552 697 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
20.07.2011 Bulletin 2011/29

(21) Application number: **03793516.0**

(22) Date of filing: **29.08.2003**

(51) Int Cl.:
G06F 1/16 *(2006.01)* ***H04N 5/225*** *(2006.01)*
H04N 5/232 *(2006.01)* ***H04N 7/18*** *(2006.01)*

(86) International application number:
PCT/CA2003/001282

(87) International publication number:
WO 2004/023816 (18.03.2004 Gazette 2004/12)

(54) **METHOD AND APPARATUS FOR TELEPRESENCE**

VERFAHREN UND VORRICHTUNG FÜR TELEPRÄSENZ

PROCEDE ET APPAREIL POUR UNE TELEPRESENCE

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL PT RO SE SI SK TR

(30) Priority: **03.09.2002 US 232418**

(43) Date of publication of application:
13.07.2005 Bulletin 2005/28

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Description

FIELD OF THE INVENTION

[0001] The invention relates to systems used for telepresence. More specifically, it relates to systems used for remote support from experts to users in the field or at home.

BACKGROUND OF THE INVENTION

[0002] Many systems already exist for field workers to receive help from an expert remotely located. These systems are not simply cordless headsets, but comprise a camera attached to a headset that allows a remotely located person to view what the user is viewing. The remote person can see what the user is seeing and speak to the user via a speaker. The user can also communicate with the remote person using a microphone.

[0003] These systems have a multitude of applications, ranging from the medical field and the industrial field, to the telecommunications field. Having an expert to consult as if he or she was standing next to you is quite valuable.

[0004] Moreover, these systems could also be used for remote technical support. Users sitting at home and having computer problems could greatly benefit from an apparatus that allows them to contact a person that could see what they are seeing and be able to guide them through solving their problems. The same could be done with electrical problems encountered in the home. A person who can view what.a user is doing can easily guide the user through simple electrical repairs.

[0005] The system can also be used for training. The expert can wear a headset-camera system to demonstrate a procedure to a technician who watches the display.

[0006] US patent 5,933,479 discloses a remote service system using high tech video links over conventional phone lines, using two-way wireless audio and visual communication in real time, so that technicians at a central site can see exactly what the customer's maintenance person is seeing. This allows an untrained technician or someone unfamiliar with the device to be the eyes, ears and hands of the technician at the central site, so that the maintenance person can be talked through a repair process. For this purpose, the maintenance person wears a headset camera and a microphone.

[0007] WO 00/60868 A1 describes a system for deploying multiple video perception technologies remotely by means of a robot while an operator controls the multiple mono and stereo video inputs in a hand-free manner. The system is useful as a viewing system, but does not address the problems encountered when needing to solve the problem in the field without having an expert go out in the field. The operator cannot, without the presence of an individual in the field, properly interact with the scene in order to not only diagnose the problem but take the actions required to solve it.

[0008] However, the existing telepresence systems are bulky and impractical. Because the cameras attached to the headsets are heavy, the apparatus requires an image stabilizing process in order to provide a clear image. An example of this can be seen in US patent 6,342,915.

[0009] Another disadvantage to the existing telepresence systems is the lack of detail that can be viewed by the remotely located person. The camera that is provided produces an image of the field of view of the user, but without the details. It is more of a global view. However, if the user advances too closely to the target image, then the image is out of focus.

[0010] WO 01/80212 A refers to a personal wireless video entertainment system and more specifically to video images delivered through a portable personal wireless interactive video display system, and specifically to a hands-free personal video display device worn as a headset and adapted for displaying any one of a plurality of user-selectable displays representing corresponding views of a scene. However, WO 01/80212 discloses also a method for the use of such a system for an educational or training event, where one camera is worn by an instructor, such as a surgeon demonstrating as an expert a surgical operation. The images are transmitted to students remote to the instructor. Another camera may be positioned to view other scenes associated with the operation, such as the view seen via a fiber optic probe that might be hand-hold and is used by the instructor during the operation.

[0011] In cases such as technical problems that a user is to be guided through, it would be advantageous to have a close-up view in addition to the general view already provided.

[0012] Moreover, since it is essential in a remote support setting to facilitate the communication between the user and a remote helper, there is a need to improve the current telepresence systems such that the remote helper can have access to all the necessary information in order to solve the problems encountered.

SUMMARY OF THE INVENTION

[0013] Accordingly, an object of the present invention is to facilitate communication between a field user of telepresence equipment and a remote user.

[0014] Another object of the present invention is to increase the consultation of experts while minimizing the displacements of the experts.

[0015] According to a first broad aspect of the present invention, there is provided a method for telepresence between a field user wearing telepresence equipment and a remote user according to claim 1.

[0016] Preferably, the global camera is a video camera, the detail camera comprises a switch to initiate and stop transmission of close-up images, and the detail camera has a light to illuminate its field of view. The detail

camera is attached to a transmitter module using a coil cord or straight cable. The transmitter module is worn at the waist and includes batteries, a transmitter, and connectors for the detail camera and the global camera.

[0017] According to a second broad aspect of the present invention, there is provided an apparatus for telepresence between a field user and a remote user according to claim 14.

[0018] Preferably, the transmission means are comprised in an enclosure attachable to a belt of the field user and the detailed camera is hooked onto the enclosure via a connecting mechanism when not in use. The detailed camera preferably has an activation switch to initiate and terminate the image capture of image close-ups, which are automatically transmitted to the remote display when the detailed camera is in use.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] These and other features, aspects and advantages of the present invention will become better understood with regard to the following description and accompanying drawings wherein:

FIG. 1 is a schematic of the portable apparatus;
FIG. 2 is a view of the headset on a user;
FIG. 3 is a view of the detachable portion of the headset;
FIG. 4 is a view of the power pack and detail camera;
FIG. 5 is a view of the detail camera
FIG. 6 is an alternative embodiment of the headset;
FIG. 7 is another alternative embodiment of the headset;
FIG. 8 is yet another alternative embodiment of the headset;
FIG. 9 is a view of the remote viewing device; and
FIG. 10 is a flowchart of the method of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0020] Figure 1 depicts the portable apparatus to be worn by a user. It consists of a headset 30 connected to a power pack 32 that can be worn at the belt. The power pack 32 comprises the battery, electronics for transmitting and receiving audio and video signals, video compression electronics, an antenna, and connectors for both cameras. The power pack 32 and headset 30 are linked by a cable 33. Alternatively, the connection between the two could be wireless (not shown) and a battery would be integrated into the headset.

[0021] Figure 2 shows the headset portion more clearly. A headband 35 is worn around the head to support the apparatus. Once end of the headband is formed of two pad-like support means 37 to enable the headset to remain stable. In the preferred embodiment, the pad-like support means 37 are cushioned on one side to rest against the head of the user and hard on the other side to provide more stability to the headset. Alternatively, any type of support means may be used to allow the headset to reside in a stable manner on a user's head. A second end of the headband covers one of the user's ears. A speaker 39 is connected to a connector portion 40 of the headband and rests on the user's ear. Alternatively, a user can use the speaker of a computer or of a video-conferencing system to receive audio signals. A microphone 41 extends outwards from the connector portion 40 towards the user's mouth. The connecting cable 33 also extends from the connector portion 40. A first camera 43 is attached to the headset on the connector portion 40. It is at substantially eye level but does not obstruct the user's view. The camera 43 is a global camera that captures the perspective view of the user. The headset is adjustable in length via a grooved plastic member 45 into which the headband 35 is inserted. The headset is always centered in the middle of the ear. As it is based on a human scale, the camera 43 and microphone 41 are automatically leveled properly.

[0022] Figure 3 shows how a portion of the headset is detachable. The connector 40, camera 43, microphone 41, and cable 33 can be detached from the headset 30, leaving behind the headband 35, speaker 39, and support means 37. The camera 43 can then be handled manually, capturing a viewpoint different than the user's viewpoint. The user can manipulate the camera to see images that otherwise would not be accessible. The camera 43 and microphone 41 are also detachable for transportation purposes. Alternatively, it is possible to detach only the camera 43 and use it as a hand-held camera while keeping the speaker 39 and microphone 41 attached to the headset 30.

[0023] Figure 4 shows the portable power pack 32 and a second camera 52. The second camera 52 is handheld and for viewing details. It is attachable to the power pack 32 via a connecting piece 54 on the exterior housing of the processor 32. A coil cord 50 connects the camera 52 to the power pack 32. Alternatively, the connection can be wireless. A small antenna 56 is also present on the power pack 32 to transmit the images captured by the first camera 43 and the second camera 52 wirelessly. Alternatively, this antenna 56 can be replaced by a wire, wherein the power pack 32 is connected directly into a system such as a computer. The back of the housing of the power pack 32 comprises a clip (not shown) to wear the apparatus on a belt or any other type of body harness worn such that the power pack 32 is positioned ergonomically.

[0024] In figure 5, the detail camera 52 is depicted. A connector 58 is present in order to attach the camera 52 to the complementary connecting piece 54 on the exterior housing of the power pack 32. A small button 60 turns the camera 52 on or off. The button 60 can be a switch or a slide button. When the button 60 is pressed, the camera 52 is capturing images. When the button 60 is released, the camera 52 is no longer capturing any images and the images transmitted come from the global

camera 43. A small light 62 is present above on the camera 52 above the lens 64 to illuminate the object being imaged. The light 62 is not always turned on when using the detail camera 52. In some situations, the light may reflect back into the image and have a negative effect. Alternatively, a laser could be present instead of the light 62 to allow the user to align the camera 52 properly with its target. Other aligning mechanisms are also possible. Furthermore, the detail camera 52 may comprise a focusing mechanism, such as a zoom lens.

[0025] Alternatively, the two cameras 43 and 52 can be attached together, as seen in figure 6. The two are attached to the headset, one camera facing a direction while the other camera faces the opposite direction. The user can choose between a wider view and a narrower view by rotating the dual camera piece by 180 degrees. The cameras can be detached from the headset and handled manually, giving the user the freedom of which view to present to the remotely located expert.

[0026] Figure 7 shows yet another alternative embodiment for the headset. In this case, only one camera 43 is present on the headset, the second camera being worn at the belt (not shown). However, a Liquid Crystal Display (LCD) 68 is also attached to the headset. The LCD displays what is being viewed by the camera. When the image is coming from the global camera 43, the image on the LCD 68 seen is the global one. When the image is coming from the detail camera 52, the image on the LCD 68 is the detail one. Alternatively, the two images may be viewed simultaneously on the LCD 68. A picture-in-picture type of display is used, with the detail camera 52 image being displayed in a small corner within the image of the global camera 43 image. The LCD 68 is placed at eye level slightly above the camera 43. If desired, the LCD can pivot backwards and be pushed out of the way when not in use (not shown).

[0027] Also seen on figure 7 is an earpiece 70 instead of a big speaker 39 as shown in figure 2. The earpiece 70 is placed around the ear and rests against the head to provide stability to the headset. A smaller speaker (not shown) is present on the inner part of the connector 40 for the user to hear any voice communications from the remote expert.

[0028] Figure 8 shows a wireless version of the headset. An antenna 72 is present on one side of the headset for receiving and transmitting voice and data signals. Batteries 74 are placed inside the headband. There are two transmission options available: digital or analog transmissions for video and audio signals. Alternatively, a transmission can be done via a cellular phone.

[0029] Figure 9 shows the device that can be used by a person at a remote location to communicate with the user or by the user local in order to provide feedback images of what is being displayed. The device flips open to provide a screen wherein the camera images viewed by the user appear. The images are received continuously and are therefore viewed in real time with a minimum amount of delay time. A microphone output is provided in the back, along with a video output and an audio output. Therefore, earphones, speakers, microphones, and other types of input and output devices may be connected to the apparatus. An AC connector is used to power up the device by connecting it to a power outlet. The device may have an infrared port to transmit and receive data via infrared. Alternatively, a battery is used to power up the device.

[0030] Since more than one type of data is being transmitted (voice, images, control signals, etc), two frequency bands may be used. Alternatively, both voice and image information can be sent and received on one frequency band. Also alternatively, images from the global camera 43 can be sent on one frequency band and images from the detail camera 52 can be sent on a second frequency band. Voice is then sent on a third frequency. The data can be in digital or analog format. When the data transmitted is in a digital format, wireless Local Area Network (LAN) protocols such as 802.11a or 802.11b are used. In this case, the power pack 32 first converts the analog signal into a digital signal. Then, a compression is done using MPEG 4 (for example). The signal is then transmitted using 802.11x and TCP/IP over a LAN, or any communication protocol such as for a cellular phone. The streamed data can then be routed onto the LAN to a PC. When using an analog transmission, a receiver is connected to a PC, a monitor, a television, or even a projector.

[0031] Alternatively, The remote expert can view the images via the web. The camera on the headset can be a webcam and the data can be transmitted via the internet. A website can be dedicated to this purpose. The device may also have a USB port to connect itself to a PC, a firewire 1394 port, or any equivalent.

[0032] The images that appear to the remote user may be from the global camera and detail camera simultaneously. This can be done via a picture-in-picture set-up or a split-screen setup. Alternatively, images from one camera are viewed at one time.

[0033] Preferably, both cameras are color high resolution cameras to provide crisp and focused images. The cameras 43 and 52 may have interchangeable lenses. The lenses used have focal lengths that can range between 2-25 mm. The same lens can be used in both cameras and provide a different effect due to the proximity to the object that is being imaged.

[0034] In figure 10, the method for telepresence is illustrated. First, telepresence equipment is provided 76. The equipment comprises a global camera, which can be a video camera or a still camera, a detail camera for close-up views, and an audio link. For the audio link; the communication is to be two way. Therefore, the minimum required is a microphone and a speaker. The next step is to mount the global camera on the head of the field user 78. The camera can be mounted on the left or right side of the head or on top of the head. The camera must move with the field user in the same direction as the head moves. Preferably, the camera is mounted onto a head-

band placed on the field user's head and is at substantially eye level.

[0035] Once the global camera is on the field user's head, images are to be transmitted from the global camera to a remote display 80. A power pack is used to power up the camera and a switch turns it on. A remote user views the images on the remote display. The field user then receives instructions from the remote user on where to point a detail camera 82. The field user points the detail camera to specified objects 84 and the images from the detail camera are transmitted to the remote display 86.

[0036] By placing the detail camera in very close proximity to an object, a high spatial resolution is obtained. For the purpose of this invention, high spatial resolution means the number of pixels per inch on an object. The global camera provides a very low spatial resolution for each object viewed while the detail camera provides a high spatial resolution.

[0037] A preferred embodiment comprises using the apparatus described above. The global camera sits in a stable manner on the field user's head. The field user has a power pack worn at the waist to power the camera and transmit the images wirelessly, or through a long cable, such as a 30 foot cable. The power pack also comprises a connector hook to attach the detail camera. Therefore, the field user has his hands free until the detail camera is unhooked from the power pack and pointed to a specific object. A light on the detail camera is provided to illuminate the field of view of the detail camera. When the remote user has seen what was asked for, the detail camera is placed back onto its connector hook and the field user can follow instructions from the remote user on how to complete the task at hand.

[0038] It can be appreciated that the described apparatus may be used by home owners to speak to technical support personnel for help with their computer. It can also be used for guidance to solve electrical or plumbing problems in the home. It can also be used by field workers who need access to experts that are not present in the field, for example working on power towers, in mines, in sewers, etc.

Claims

1. A method for telepresence between a field user wearing telepresence equipment and a remote user, the method composing:

   providing said telepresence equipment worn by a field user when in use and including a global camera (43) and a two-way audio link for communication between said field user and said remote user;
   mounting said global camera (43) and said two-way audio link on the field user's head set (30) to obtain an image of the field user's viewpoint:
   transmitting images from the global camera (43) to a remote display for said remote user to view;
   receiving instructions from said remote user through said two-way audio link;
   characterized by the steps:
   providing said telepresence equipment with a handheld detail camera (52) for obtaining image close-ups, the handheld detail camera (52) and the global camera (43) being part of a portable telepresence equipment worn by the field user when in use wherein the detail camera (52) is hooked onto the portable apparatus via a connecting mechanism when not in use,
   receiving instructions from said remote user through said two-way audio link on where to point the detail camera (52) when the remote user instructs the field user via the two-way audio link to point at a certain detail seen by the global camera;
   pointing said detail camera (52) to specified objects:
   transmitting images from the detail camera (52) to said remote display for said remote user to view; and
   mounting a second display (68) to the portable telepresence equipment to view the images being transmitted.

2. A method as claimed in claim 1, wherein pointing said detail camera (52) comprises removing said detail camera from a hook, pointing said detail camera to specified objects, and replacing said detail camera on said hook.

3. A method as claimed in claims 1 or 2, wherein pointing said detail camera (52) to specified objects comprises pressing a switch on said detail camera to begin transmission of close-up images and releasing said switch to end transmission of said detail images, wherein preferably said pressing a switch turns on a light (62) illuminating a field of view for said detail camera.

4. A method as claimed in any one of claims 1 to 3, wherein said providing said telepresence equipment comprises providing an aligning mechanism on said detail camera (52), wherein said providing an aligning mechanism comprises preferably providing a laser to align said detail camera.

5. A method as claimed in any one of claims 1 to 4, wherein said providing said telepresence equipment comprises providing a focusing mechanism on said detail camera (52).

6. A method as claimed in any one of claims 1 to 5, wherein said transmitting images and said receiving instructions comprises transmitting images and receiving instructions through a wireless network or

through the Internet.

7. A method as claimed in any one claim 1 to 6, wherein said transmitting images from the global camera (43) to a remote display comprises transmitting said images using a cellular phone.

8. A method as claimed in any one of claims 1 to 7, wherein said transmitting images from the global camera (43) and transmitting images from the detail camera (52) comprises transmitting from a same transmitter.

9. A method as claimed in claim 8, wherein said transmitting images comprises transmitting audio from said same transmitter.

10. A method as claimed in any one of claims 1 to 9, wherein said second display is mounted to said field user's head.

11. A method as claimed in any one of claims 1 to 10, wherein said mounting said global camera (43) comprises mounting in a detachable manner such that a global view being displayed may be changed by detaching and moving said global camera.

12. A method as claimed in any one of claims 1 to 11, wherein said providing a global camera (43) comprises providing a global video camera.

13. A method as claimed in any one of claims 1 to 12, wherein said pointing said detail camera (52) comprises obtaining a high spatial resolution.

14. An apparatus for telepresence between a field user and a remote user, the telepresence equipment worn by a field user when in use and comprising:

a headset (30) having a two-way audio link for communication between said field user and said remote user:
a global camera (43) mounted to said headset (30) for obtaining an image of said field user's viewpoint; and
transmission means for transmitting images from said global camera (43) and said detail camera (52) to a remote display for said remote user to view;
characterized in that a handheld detail camera (52) for obtaining image close-ups by said field user is provided. When the remote user instructs the field user via the two-way audio link to point at a certain detail seen by the global camera, the transmission means are provided for transmitting images from said detail camera (52) to a remote display for said remote user to view,
wherein the handheld detail camera (52) and the global camera (43) being part of the portable telepresence equipment wherein the detail camera (52) is hooked onto the portable telepresence equipment via connecting mechanism when not in use, and a second display (68) is mounted to said portable telepresence apparatus to view the images being transmitted.

15. An apparatus as claimed in claim 14, wherein said handheld detail camera (52) is attachable at a hip of said field user by one of a belt and a body harness.

16. An apparatus as claimed in claim 14, wherein said handheld detail camera (52) has an activation switch to initiate image capture of said image close-ups and/or transmission of said images from said detail camera.

17. An apparatus as claimed in claim 16, wherein release of said activation switch terminates said image capture of said image close-ups and/or said transmission of said images from said detail camera (52).

18. An apparatus as claimed in any one of claims 16 to 17, wherein said activation switch turns on a light (62) illuminating a field of view of said detail camera (52).

19. An apparatus as claimed in any one of claims 14 to 18, wherein said handheld detail camera (52) comprises an aligning mechanism, preferably a laser, for targeting an object to be captured in said image close-ups.

20. An apparatus as claimed in any one of claims 16 to 19, wherein said handheld detail camera (52) has a focusing mechanism.

21. An apparatus as claimed in claim 14, wherein said transmission means comprises means for transmitting through a wireless network to allow a field user freedom to move around without a wired connection to a fixed transmission station and/or means for transmitting through the internet to allow a field user to connect and transmit using a personal computer and/or a single transmitter to transmit images from said global camera and said handheld detail camera.

22. An apparatus as claimed in claim 21, wherein said single transmitter also transmits audio signals.

23. An apparatus as claimed in claim 14, wherein said second display is mounted to said headset (30).

24. An apparatus as claimed in claim 14, wherein said global camera (43) is detachable from said headset (30).

25. An apparatus as claimed in claim 14, wherein said transmitting means are comprised in a portable enclosure attachable at a hip of said field user and said detail camera (52) and headset (30) are connected to said portable enclosure via a wired connection.

Patentansprüche

1. Verfahren für Telepräsens zwischen einem Anwender vor Ort, der eine Telepräsensausstattung trägt, und einem entfernten Benutzer, wobei die Methode aufweist:

Bereitstellen der Telepräsensausstattung, die von einem Anwender vor Ort bei Gebrauch getragen wird und die eine Globalkamera (43) und einen Zwei-Wege Audiolink zur Kommunikation zwischen dem Anwender vor Ort und dem entfernten Benutzer umfasst;
Befestigen der Globalkamera (43) und des Zwei-Wege Audiolinks am Headset (30) des Anwenders vor Ort, um ein Bild des Blickwinkels des Anwenders vor Ort zu erhalten;
Übertragung von Bildern von der Globalkamera zu einer entfernten Anzeige zur Ansicht für den entfernten Benutzer;
Erhalten von Instruktionen vom entfernen Benutzer durch den Zwei-Wege Audiolink;

gekennzeichnet durch die Schritte:

Versehen der Telepräsenzausrüstung mit einer handgeführten Detailkamera (52) zum Erhalt von Bildern als Nahaufnahme, wobei die handgeführte Detailkamera (52) und die Globalkamera (43) Teil einer tragbaren Telepräsensausstattung sind, die vom Anwender vor Ort bei Gebrauch getragen wird, wobei die Detailkamera (52) an der tragbaren Vorrichtung mittels eines Verbindungsmechanismus angehängt ist, wenn sie nicht in Gebrauch ist;
Empfangen von Anweisungen vom entfernten Benutzer **durch** den Zwei-Wege Audiolink, wohin die Detailkamera (52) zeigen soll, wenn der entfernte Benutzer den Anwender vor Ort mittels des Zwei-Wege Audiolinks instruiert, auf ein bestimmtes Detail, das von der Globalkamera gesehen wird, zu zeigen;
Richten der Detailkamera (52) auf spezifizierte Objekte;
Übermitteln von Bildern von der Detailkamera (52) zum entfernten Display zur Ansicht für den entfernten Benutzer; und
Anbringen eines zweiten Display (68) an der tragbaren Telepräsensausstattung, um die zu übermittelnden Bilder anzusehen.

2. Verfahren nach Anspruch 1, wobei das Richten der Detailkamera (52) ein Entfernen der Detailkamera von einem Haken, ein Richten der Detailkamera auf spezifizierte Objekte und ein Wiederanbringen der Detailkamera an dem Haken aufweist.

3. Verfahren nach den Ansprüchen 1 oder 2, wobei ein Richten der Detailkamera (52) auf spezifizierte Objekte ein Drücken eines Schalters an der Detailkamera zum Beginn einer Übertragung von Bildern als Nahaufnahmen und ein Loslassen des Schalters zur Beendigung einer Übertragung der Detailbilder umfasst, wobei das Pressen eines Schalters vorzugsweise ein Licht (62) anschaltet, das ein Blickfeld für die Detailkamera ausleuchtet.

4. Verfahren nach einem der Ansprüche 1 bis 3, wobei das Bereitstellen der Telepräsensausstattung ein Vorsehen eines Ausrichtmechanismus an der Detailkamera (52) aufweist, wobei das Vorsehen eines Ausrichtmechanismus vorzugsweise das Bereitstellen eines Lasers zum Ausrichten der Detailkamera umfasst.

5. Verfahren nach einem der Ansprüche 1 bis 4, wobei das Vorsehen der Telepräsensausrüstung das Vorsehen eine Fokussiermechanismus an der Detailkamera (52) aufweist.

6. Verfahren nach einem der Ansprüche 1 bis 5, wobei das Übermitteln von Bildern und das Erhalten von Instruktionen das Übermitteln von Bildern und das Erhalten von Instruktionen durch eine Wireless Netzwerk oder durch das Internet umfasst.

7. Verfahren nach einem Anspruch 1 bis 6, wobei das Übermitteln der Bilder von der Globalkamera (40) an das entfernte Display ein Übermitteln der Bilder unter Verwendung eines Zellulartelefons umfasst.

8. Verfahren nach einem der Ansprüche 1 bis 7, wobei das Übermitteln der Bilder von der Globalkamera (43) und das Übermitteln der Bilder von der Detailkamera (52) ein Übermitteln vom selben Transmitter umfasst.

9. Verfahren nach Anspruch 8, wobei das Übermitteln der Bilder ein Übermitteln von Audiosignalen von demselben Transmitter umfasst.

10. Verfahren nach einem der Ansprüche 1 bis 9, wobei das zweite Display am Kopf des Benutzers vor Ort angebracht ist.

11. Verfahren nach einem der Ansprüche 1 bis 10, wobei die Befestigung der Globalkamera (43) eine Befestigung in einer lösbaren Weise so aufweist, dass eine darzustellende Globalansicht durch Abnehmen und

Bewegen der Globalkamera geändert werden kann.

12. Verfahren nach einem der Ansprüche 1 bis 11, wobei das Vorsehen einer Globalkamera (43) ein Vorsehen einer globalen Videokamera umfasst.

13. Verfahren nach einem der Ansprüche 1 bis 12, wobei das Richtten der Detailkamera (52) ein Erhalten einer hohen räumlichen Auflösung aufweist.

14. Vorrichtung zur Telepräsenz zwischen einem Anwender vor Ort und einem entfernten Benutzer, wobei die Telepräsenzausstattung von einem Anwender vor Ort bei Gebrauch getragen wird und aufweist:

ein Headset (30) mit einem Zwei-Wege Audiolink zur Kommunikation zwischen dem Anwender vor Ort und dem entfernten Benutzer;
eine Globalkamera (43), die an dem Headset (30) zum Erhalt eines Bilds des Blickwinkels des Anwenders vor Ort befestigt ist; und
Übertragungsmittel zur Übertragung von Bildern von der Globalkamera (43) und der Detailkamera (52) an ein entferntes Display zur Ansicht für den entfernten Benutzer;
dadurch gekennzeichnet, dass eine hand geführte Detailkamera (52) zum Erhalt von Bildern als Nahaufnahmen durch den Anwender vor Ort vorgesehen ist, wenn der entfernte Benutzer den Anwender vor Ort mittels dem Zwei-Wege Audiolink instruiert, auf ein bestimmtes Detail, das von der Globalkamera gesehen wird, hinzudeuten, wobei die Übertragungsmittel zur Übertragung von Bildern von der Detailkamera (52) an ein entferntes Display zur Ansicht für den entfernten Benutzer vorgesehen sind,

wobei die handgeführte Detailkamera (52) und die Globalkamera Teil einer tragbaren Telepräsensausstattung sind, wobei die Detailkamera (52) an der tragbaren Telepräsensausrüstung mittels eines Verbindungsmechanismus angehängt ist, wenn sie nicht im Gebrauch ist, und ein zweites Display (68) an der tragbaren Telepräsensausstattung zur Ansicht der zu übermittelnden Bilder befestigt ist.

15. Vorrichtung nach Anspruch 14, wobei die handgeführte Detailkamera (52) an einer Hüfte des Anwenders vor Ort durch eines der Elemente umfassend einen Gürtel und ein Fördergurtsystem befestigbar ist.

16. Vorrichtung nach Anspruch 15, wobei die handgeführte Detailkamera (52) einen Aktivierungsschalter aufweist, um eine Bilderfassung der Bilder als Nahaufnahmen und/oder eine Übertragung der Bilder von der Detailkamera zu initiieren.

17. Vorrichtung nach Anspruch 16, wobei ein Loslassen des Aktivierungsschalters die Bilderfassung der Bilder als Nahaufnahme und/oder die Übertragung der Bilder von der Detailkamera (52) beendet.

18. Vorrichtung nach einem der Ansprüche 16 bis 17, wobei der Aktivierungsschalter ein Licht (62) einschaltet, das ein Blickfeld der Detailkamera (52) erleuchtet.

19. Vorrichtung nach einem der Ansprüche 14 bis 18, wobei die handgeführte Detailkamera (52) einen Ausrichtmechanismus, vorzugsweise einen Laser zum Zielen auf ein in dem Nahaufnahme-Bild zu erfassendes Objekt aufweist.

20. Vorrichtung nach einem der Ansprüche 16 bis 19, wobei die handgeführte Detailkamera (52) einen Fokussiermechanismus hat.

21. Vorrichtung nach Anspruch 14, wobei die Übertragungsmittel Mittel zur Übertragung durch eine Wireless Netzwerk aufweisen, um einem Anwender vor Ort die Freiheit zu geben, sich ohne eine Kabelverbindung mit einer feststehenden Übertragungsstation umher zu bewegen, und/oder Mittel zur Übertragung durch das Internet aufweisen, um es einem Anwender vor Ort zu gestatten, sich unter Verwendung eines Personal Computers und/oder eines einzelnen Transmitters zu verbinden und zu senden, um Bilder von der Globalkamera und der handgeführten Detailkamera zu übertragen.

22. Vorrichtung nach Anspruch 21, wobei der einzelne Transmitter auch Audiosignale überträgt.

23. Vorrichtung nach Anspruch 14, wobei das zweite Display an dem Headset (30) befestigt ist.

24. Vorrichtung nach Anspruch 14, wobei die Globalkamera (43) vom Headset (30) abnehmbar ist.

25. Vorrichtung nach Anspruch 14, wobei die Übertragungsmittel in einer tragbaren Umhüllung aufgenommen sind, die an einer Hüfte des Anwenders vor Ort befestigbar ist, und die Detailkamera (52) und das Headset (30) über eine Kabelverbindung mit der tragbaren Umhüllung verbunden sind.

Revendications

1. Procédé de téléprésence permettant à un utilisateur sur le terrain portant un équipement de téléprésence de communiquer avec un utilisateur distant, ce procédé comprenant
la fourniture dudit équipement de téléprésence porté par un utilisateur sur le terrain pendant l'utilisation,

et comprenant une caméra générale (43) et une liaison audio bidirectionnelle permettant audit utilisateur sur le terrain et audit utilisateur distant de communiquer ;
la fixation de ladite caméra générale (43) et de ladite liaison audio bidirectionnelle sur le casque (30) de l'utilisateur sur le terrain, pour obtenir une image à l'endroit où se trouve l'utilisateur sur le terrain ;
la transmission d'images depuis la caméra générale (43) vers un écran distant pour que ledit utilisateur distant puisse les visualiser ;
la réception d'instructions dudit utilisateur distant par le biais de ladite liaison audio bidirectionnelle ;
caractérisé par les étapes suivantes:

la fourniture dudit équipement de téléprésence avec une caméra de détail (52) en main pour obtenir des images en gros plans, la caméra de détail (52) en main et la caméra générale (43) faisant partie d'un équipement portable de téléprésence porté par l'utilisateur sur le terrain pendant l'utilisation, sachant que la caméra de détail (52) reste - lorsqu'elle ne sert pas - accrochée contre l'appareillage portable via un mécanisme de connexion,
la réception des instructions dudit utilisateur distant, par le biais de ladite liaison audio bidirectionnelle, quant à l'endroit sur lequel braquer la caméra de détail (52) lorsque l'utilisateur distant communique des instructions à l'utilisateur sur le terrain via la liaison audio bidirectionnelle afin que ce dernier braque la caméra sur un détail précis vu via la caméra générale ;
le braquage de ladite caméra de détail (52) sur des objets spécifiés;
la transmission d'images prises par la caméra de détail (52) vers ledit écran distant pour que ledit utilisateur distant puisse les visualiser ; et
le montage d'un second écran (68) sur l'équipement portable de téléprésence, pour visualiser les images en cours de transmission.

2. Procédé selon la revendication 1, sachant que le braquage de ladite caméra de détail (52) comprend le fait de détacher ladite caméra de détail d'un crochet, de braquer ladite caméra de détail vers des objets spécifiés puis de replacer ladite caméra de détail sur ledit crochet.

3. Procédé selon la revendication 1 ou 2, sachant que le braquage de ladite caméra de détail (52) vers des objets spécifiés comprend le fait d'appuyer sur un bouton sur ladite caméra de détail pour entamer la transmission d'images en gros plans, et à relâcher ledit bouton pour mettre fin à la transmission desdites images détaillées, sachant de préférence que ledit fait d'appuyer sur un bouton allume une lampe (62) qui illumine un champ de vision pour ladite caméra de détail.

4. Procédé selon l'une quelconque des revendications 1 à 3, sachant que ladite fourniture dudit équipement de téléprésence comprend la fourniture d'un mécanisme d'alignement sur ladite caméra de détail (52), sachant que la fourniture d'un mécanisme d'alignement inclut de préférence la fourniture d'un laser pour aligner ladite caméra de détail.

5. Procédé selon l'une quelconque des revendications 1 à 4, sachant que ladite fourniture dudit équipement de téléprésence comprend la fourniture d'un mécanisme de focalisation sur ladite caméra de détail (52).

6. Procédé selon l'une quelconque des revendications 1 à 5, sachant que ladite transmission d'images et ladite réception d'instructions comprend la transmission d'images et la réception d'instructions via un réseau sans fil ou via Internet.

7. Procédé selon l'une quelconque des revendications 1 à 6, sachant que ladite transmission d'images depuis la caméra générale (43) vers un écran distant comprend la transmission desdites images à l'aide d'un téléphone portable.

8. Procédé selon l'une quelconque des revendications 1 à 7, sachant que ladite transmission depuis la caméra générale (43) et la transmission d'images depuis la caméral de détail (52) comprend la transmission depuis un même transmetteur.

9. Procédé selon la revendication 8, sachant que ladite transmission d'images comprend une transmission audio depuis ledit même transmetteur.

10. Procédé selon l'une quelconque des revendications 1 à 9, sachant que le second écran est fixé contre la tête dudit utilisateur sur le terrain.

11. Procédé selon l'une quelconque des revendications 1 à 10, sachant que ladite fixation de ladite caméra générale (43) comprend une fixation détachable afin qu'il soit possible de modifier une vue générale actuellement affichée en détachant ladite caméra générale et en la déplaçant.

12. Procédé selon l'une quelconque des revendications 1 à 11, sachant que ladite fourniture d'une caméra générale (43) comprend la fourniture d'une caméra vidéo générale.

13. Procédé selon l'une quelconque des revendications 1 à 12, sachant que le braquage de ladite caméra de détail (52) comprend l'obtention d'une haute résolution spatiale.

14. Appareillage de téléprésence reliant un utilisateur sur le terrain et un utilisateur distant, l'équipement de téléprésence étant porté par un utilisateur sur le terrain pendant l'utilisation et comprenant :

un casque (30) comportant une liaison audio bidirectionnelle assurant la communication entre ledit utilisateur sur le terrain et ledit utilisateur distant ;
une caméra générale (43) montée contre ledit casque (30) pour obtenir une image depuis l'endroit où se trouve ledit utilisateur sur le terrain ; et des moyens servant à transmettre des images depuis ladite caméra générale (43) et depuis ladite caméra de détail (52) vers un écran distant afin que ledit utilisateur distant puisse les visualiser ;
caractérisé en ce qu'une caméra de détail (52) en main est fournie pour permettre audit utilisateur sur le terrain d'obtenir des gros plans lorsque l'utilisateur distant demande à l'utilisateur sur le terrain, via la liaison audio bidirectionnelle, de pointer cette caméra vers un certain détail vu par la caméra générale, les moyens de transmissions étant fournis pour transmettre les images de ladite caméra de détail (52) à un écran distant pour que ledit utilisateur distant puisse les visualiser,
sachant que la caméra de détail (52) en main et la caméra générale (43) font partie de l'équipement de téléprésence portable, sachant que la caméra de détail (52) est accrochée sur l'équipement de téléprésence portable via un mécanisme de connexion lorsqu'elle ne sert pas, et qu'un second écran (68) est monté contre dudit appareillage de téléprésence portable afin de visualiser les images actuellement transmises.

15. Appareillage selon la revendication 14, sachant que ledit utilisateur sur le terrain peut fixer ladite caméra de détail (52) en main sur une hanche, contre une ceinture et/ou un harnais corporel.

16. Appareillage selon la revendication 14, sachant que ladite caméra de détail (52) en main comporte un interrupteur d'activation pour déclencher une capture d'images, à savoir lesdits gros plans et/ou pour transmettre lesdites images depuis ladite caméra de détail.

17. Appareillage selon la revendication 16, sachant que le fait de relâcher ledit interrupteur d'activation met fin à ladite capture d'images, à savoir lesdits gros plans et/ou à ladite transmission desdites images depuis ladite caméra de détail (52).

18. Appareillage selon l'une quelconque des revendications 16 à 17, sachant que ledit interrupteur d'activation allume une lampe (62) illuminant un champ de vision de ladite caméra de détail (52).

19. Appareillage selon l'une quelconque des revendications 14 à 18, sachant que ladite caméra de détail (52) en main comprend un mécanisme d'alignement, de préférence un laser, permettant de cibler un objet à capturer dans lesdites images en gros plans.

20. Appareillage selon l'une quelconque des revendications 16 à 19, sachant que ladite caméra de détail (52) en main comporte un mécanisme de focalisation.

21. Appareillage selon la revendication 14, sachant que ledit moyen de transmission comprend un moyen permettant de transmettre via un réseau sans fil pour permettre à un utilisateur sur le terrain de se déplacer librement sans liaison filaire raccordée à un poste de transmission fixe, et/ou un moyen permettant de transmettre via Internet pour permettre à un utilisateur sur le terrain de se connecter et de transmettre à l'aide d'un ordinateur personnel, et/ou un transmetteur unique pour transmettre des images depuis ladite caméra générale et ladite caméra de détail en main.

22. Appareillage selon la revendication 21, sachant que ledit transmetteur unique transmet aussi des signaux audio.

23. Appareillage selon la revendication 14, sachant que ledit second écran est monté contre ledit casque (30).

24. Appareillage selon la revendication 14, sachant que ladite caméra générale (43) est détachable dudit casque (30).

25. Appareillage selon la revendication 14, sachant que lesdits moyens de transmission sont inclus dans un boîtier portable que ledit utilisateur sur le terrain peut fixer contre une hanche, et que ladite caméra de détail (52) et ledit casque (30) sont connectés audit boîtier portable via une liaison filaire.

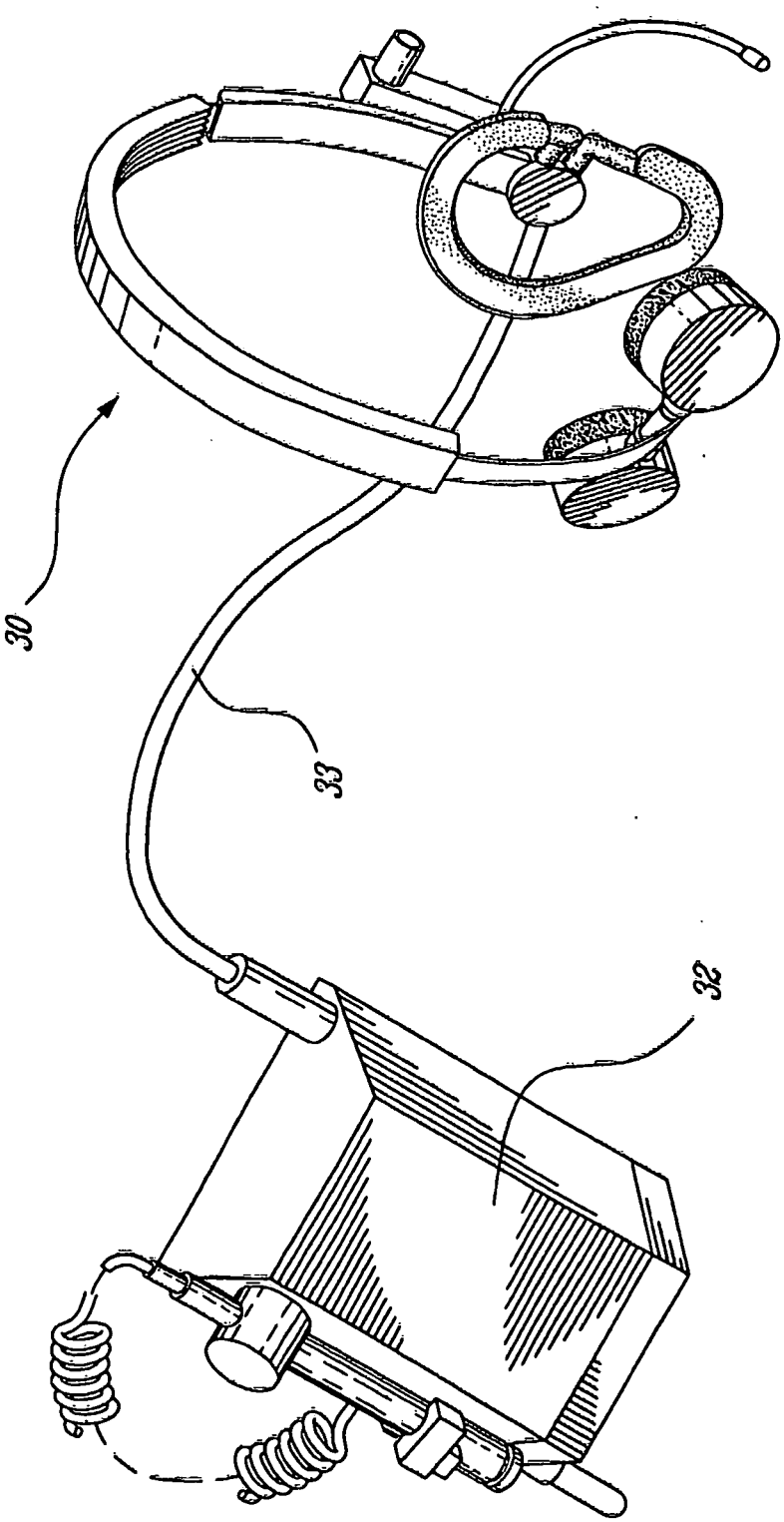


Fig. 1

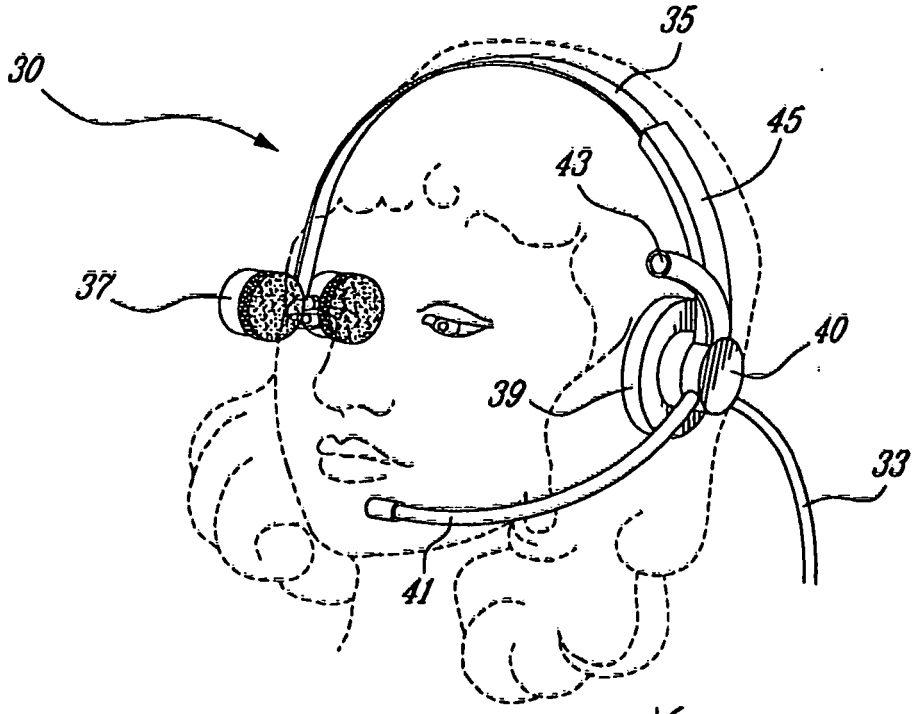


Fig. 2

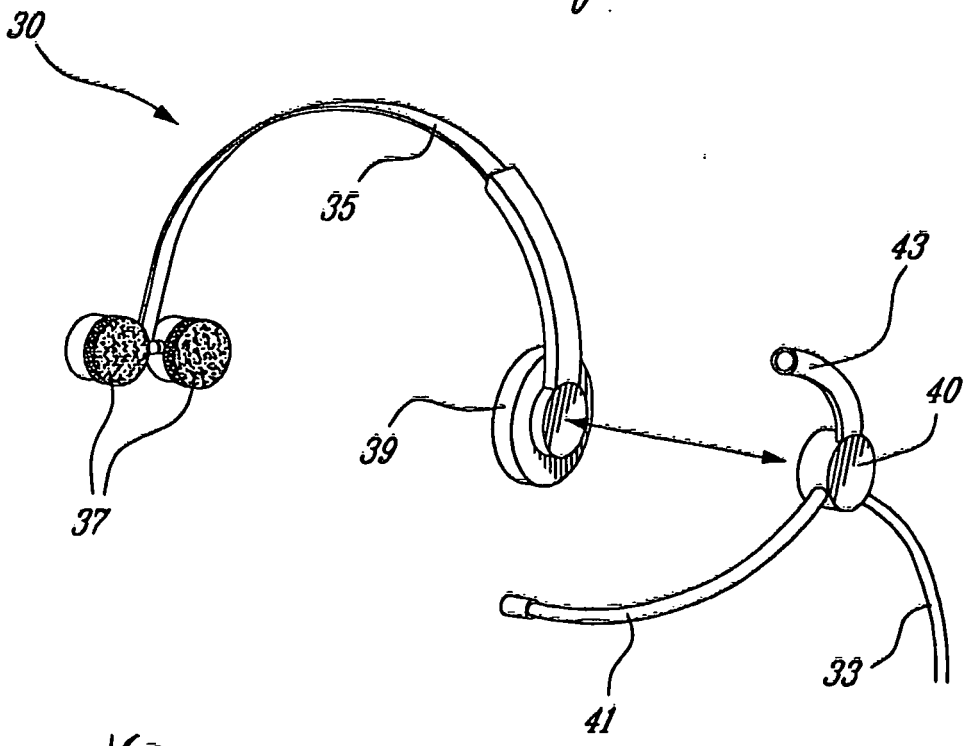


Fig. 3

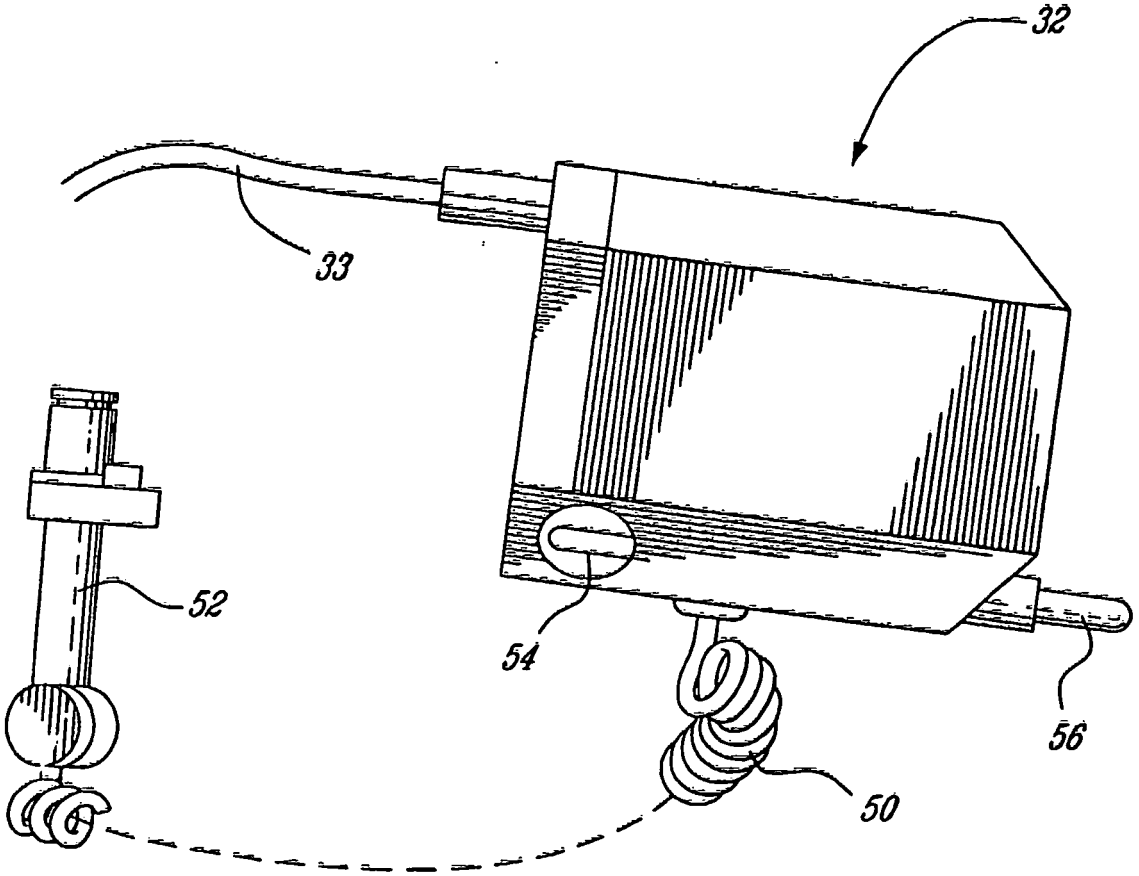


Fig. 4

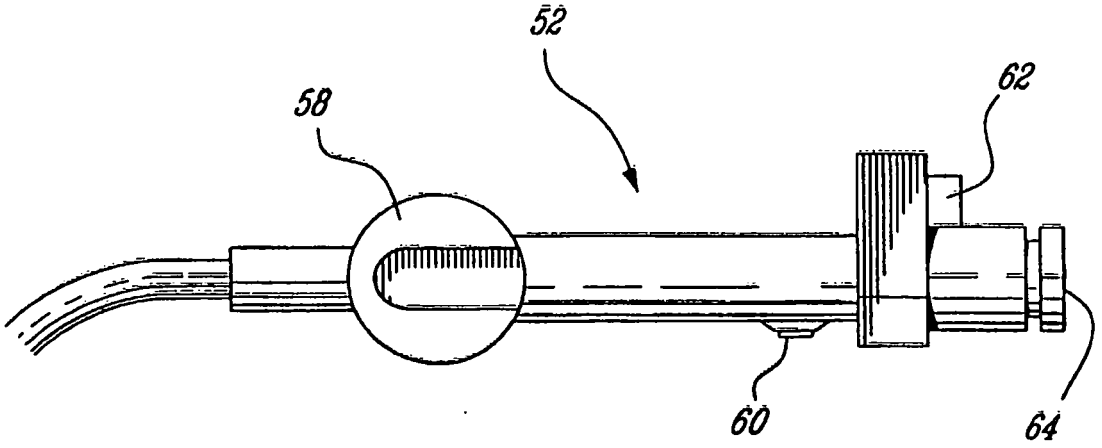


Fig. 5

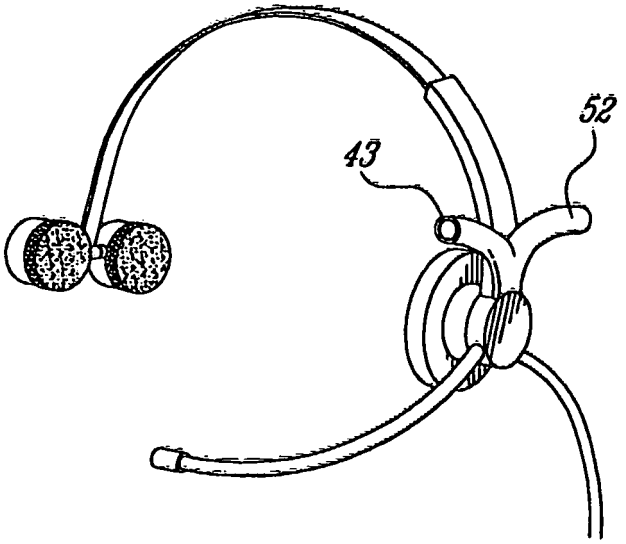


Fig. 6

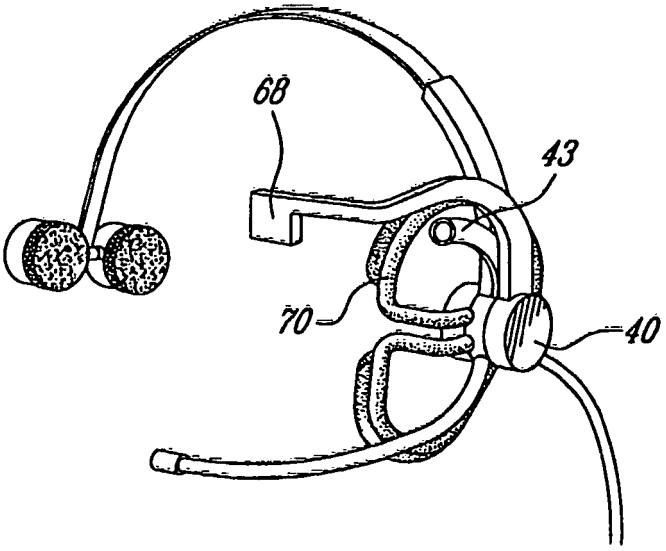


Fig. 7

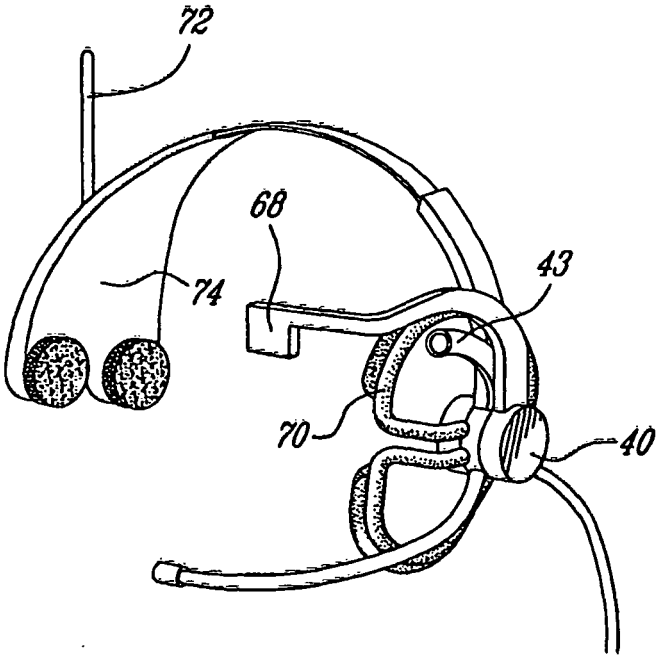


Fig. 8

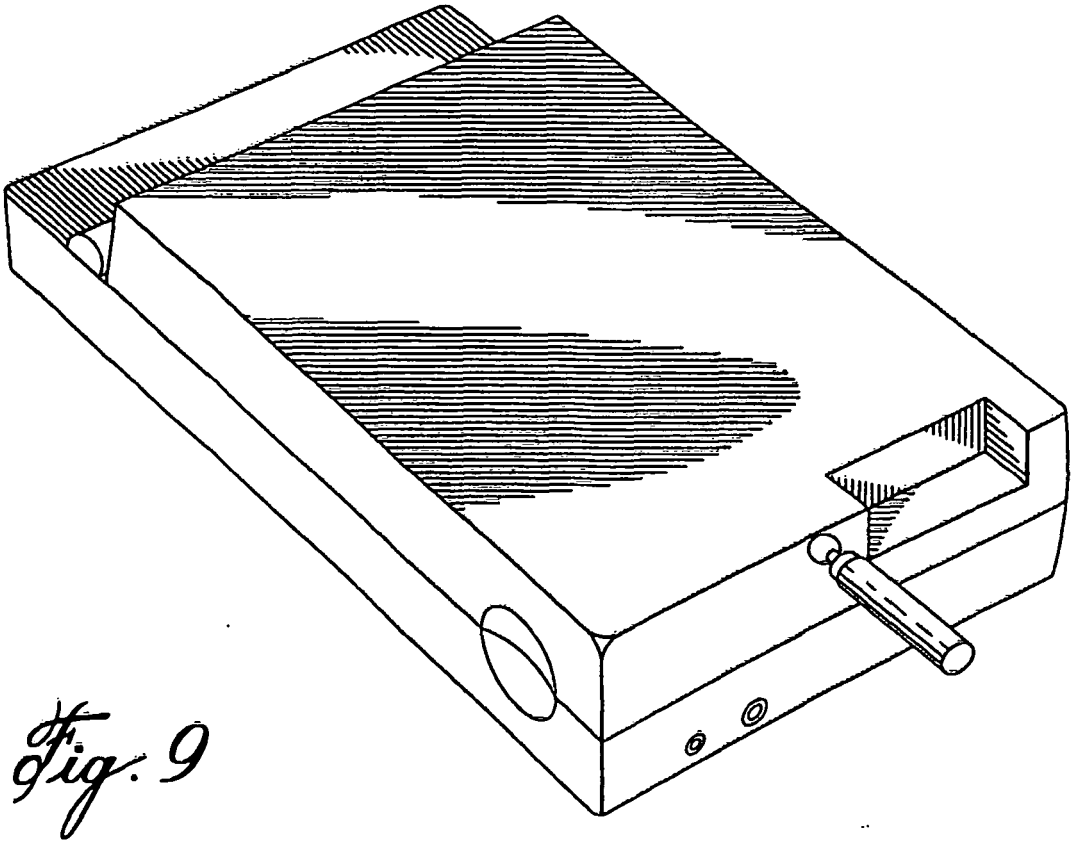
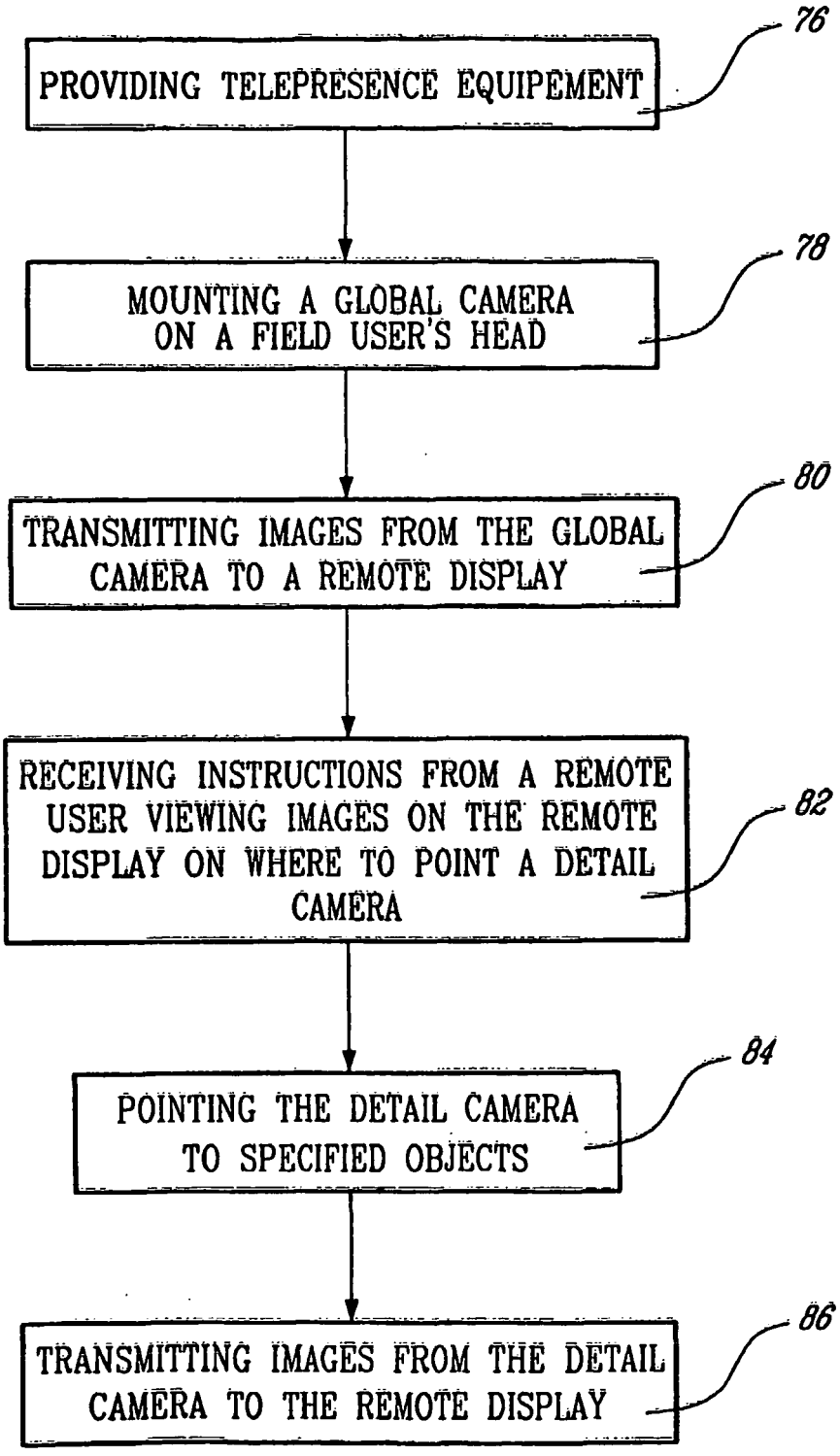


Fig. 9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76
MOUNTING A GLOBAL CAMERA ON A FIELD USER'S HEAD
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TRANSMITTING IMAGES FROM THE GLOBAL CAMERA TO A REMOTE DISPLAY
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RECEIVING INSTRUCTIONS FROM A REMOTE USER VIEWING IMAGES ON THE REMOTE DISPLAY ON WHERE TO POINT A DETAIL CAMERA
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POINTING THE DETAIL CAMERA TO SPECIFIED OBJECTS
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Fig. 10

REFERENCES CITED IN THE DESCRIPTION

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